



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Smith, *et al.*
Serial No.: 10/727,081
Filed: December 2, 2003
Customer No.: 33123
For: METHOD AND
APPARATUS FOR SELF-
REFERENCED
PROJECTION LENS
DISTORTION MAPPING

CERTIFICATE OF MAILING

I hereby certify that this correspondence and the attached papers are being deposited with the United States Postal Service with sufficient postage as first class mail on the date indicated below in an envelope addressed to:

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

3/18/04 Ann Kopel
Date

TRANSMITTAL LETTER

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

Transmitted herewith for filing in connection with the above-identified application are an Information Disclosure Statement and Form PTO-1449 (4 pages). Because this Information Disclosure Statement is filed prior to receipt of a first office action on the merits in the above-referenced application, no fee is due. However, should it be determined that a fee for filing these papers is required, the Commissioner is authorized to charge Deposit Account No. 05-1213, as stated below:

[X] The Commissioner is hereby authorized to charge any fees that may be due under 37 C.F.R. §§ 1.16-1.17 in connection with this paper or with this application during its entire pendency to Deposit Account No. 05-1213. A duplicate of this sheet is enclosed.

Respectfully submitted,
HELLER, EHRMAN, WHITE & McAULIFFE LLP

By: David A. Hall
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Ann Korpels

**INFORMATION DISCLOSURE STATEMENT
IN ACCORDANCE WITH 37 C.F.R. §§ 1.97-1.98**

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Sir:


Because this Information Disclosure Statement is filed prior to receipt of a First Office Action on the merits of the above-captioned application, a fee for filing this statement should not be due. If, however, it is determined that a fee is due, then any fees that may be due in connection with filing this paper may be charged to Deposit Account No. 50-1213.

In accordance with the duty of disclosure imposed by 37 C.F.R. § 1.56 to inform the Patent Office of all material references known by Applicant or Applicants' representative, this Information Disclosure Statement prepared in accordance with 37 C.F.R. §§ 1.97-1.98 is hereby submitted. The Form PTO-1449 (4 pages) is provided herewith for filing in connection with the above cited application. In accordance with 37 C.F.R. § 1.98(d), copies of the documents are not provided, as they have been previously provided in connection with U.S. Application Serial No. 10/434,975 filed May 9, 2003, which claims priority from U.S. Application Serial No. 09/835,201 filed April 13, 2001 (now U.S. Patent No. 6,573,986), from which this application claims priority for an earlier filing date in accordance with 35 U.S.C. § 120.


Although these documents and information are made known to the Patent and Trademark Office in compliance with Applicants' duty of disclosure, such disclosure is not to be construed as an admission by Applicants or Applicants' representative that any of the references, singly or in any combination thereof, is effective as prior art against the subject application. In accordance with 37 C.F.R. § 1.97(h), the filing of this Information Disclosure Statement shall not be construed to mean that a search has been made or that no other material information as defined in 37 C.F.R. § 1.56(b) exists.

Applicants respectfully request that the Examiner review the foregoing references and request that they be made of record in the file history of the above-captioned application.

Respectfully submitted,
HELLER, EHRMAN, WHITE & McAULIFFE LLP

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR §1.56, §1.97, and §1.98 PTO-1449 FORM		ATTORNEY DOCKET NO.: 38203-6080C	SERIAL NO.: 10/727,081
 <div style="text-align: right; margin-top: 20px;">Sheet 1 of 4</div>		APPLICANTS: Smith et al.	
		FILING DATE: 12/02/2003	GROUP ART UNIT: Unknown

U.S. PATENT DOCUMENTS						
† EX'R INITIAL	*REF. #	PATENT NUMBER	DATE	NAME	U.S. CLASS/ SUBCLASS	FILING DATE (If appropriate)
	A*	4,861,148	08/29/89	Santo <i>et al.</i>	350/505	03/11/87
	B*	5,285,236	02/08/94	Jain	355/53	09/30/92
	C*	5,402,224	3/28/95	Hirukawa <i>et al.</i>	356/124	9/24/93
	D*	5,438,413	08/01/95	Mazor <i>et al.</i>	356/363	03/03/93
	E*	5,615,006	3/25/97	Hirukawa <i>et al.</i>	356/124	6/6/95
	F*	5,757,507	05/26/98	Ausschnitt <i>et al.</i>	356/401	11/20/95
	G*	5,877,861	3/2/99	Ausschnitt <i>et al.</i>	356/401	11/14/97
	H*	5,894,350	4/13/99	Hsieh <i>et al.</i>	356/399	6/12/98
	I*	6,079,256	06/27/00	Bareket	73/105	12/07/98
	J*	6,143,621	11/07/00	Tzeng <i>et al.</i>	438/401	06/14/99
	K*	6,259,525	7/10/01	David	356/399	2/24/00

FOREIGN PATENT DOCUMENTS				
† EX'R INITIAL	*REF. #			TRANSLATION (YES/NO)
		NONE		


OTHER DOCUMENTS		
† EX'R INITIAL	*REF. #	CITATION (Author, Article Title, Journal/Book Title, Date, Pertinent Pages, etc.)
	L*	Armitage Jr., J.D. and Kirk, J.P., "Analysis of overlay distortion patterns", <i>SPIE</i> , <u>921</u> :207-222, (1988)
	M*	Bjorkholm <i>et al.</i> , "Reduction imaging at 14 nm using multilayer-coated optics: printing of features smaller than 0.1 μm ", <i>J. Vac. Sci. Technol. B.</i> , <u>8(6)</u> :1509-1543, (1990)
	N*	Brunner, T.A., "Impact Of Lens Aberrations On Optical Lithography", <i>IBM Journal of Research and Development: Optical Lithography</i> 41(1-2):57-67, (1997) (http://www.research.ibm.com/journal/rd/411/brunner.html)

EXAMINER'S SIGNATURE	DATE CONSIDERED
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† EXAMINER: Initial if reference is considered, whether or not citation is in conformance with MPEP 609. Line through citation if not in conformance and not considered. Include copy of this form in next communication to applicant.


* If an asterisk is placed beside the reference number, a copy is not provided because the reference was previously cited by or submitted to the PTO in a prior application that is identified in the statement and relied upon for an earlier filing date under 35 U.S.C. 120. 37 C.F.R. 1.98(d).

TITLE: METHOD AND APPARATUS FOR SELF-REFERENCED PROJECTION LENS DISTORTION MAPPING

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 <div style="text-align: right;">Sheet 2 of 4</div>	APPLICANTS: Smith et al.	GROUP ART UNIT: Unknown
	FILING DATE: 12/02/2003	


OTHER DOCUMENTS		
	O*	Bruning <i>et al.</i> , "Optical Lithography – Thirty years and three orders of magnitude", <i>SPIE</i> , <u>3051</u> :14-27, (1997)
	P*	Cote <i>et al.</i> , "Micrascan™ III-performance of a third generation, catadioptric step and scan lithographic tool", <i>SPIE</i> , <u>3051</u> :806-816, (1997)
	Q*	DeJule, R., "Mix-and Match: A Necessary Choice", <i>Semiconductor International</i> , <u>23(2)</u> : 66-76, (Feb, 2000)
	R*	Dooly, T. and Yang, Y., "Stepper matching for optimum line performance", <i>SPIE</i> , <u>3051</u> :426-432, (1997)
	S*	Goodwin, F. and Pellegrini, J.C., "Characterizing Overlay Registration of Concentric 5X and 1X Stepper Exposure Fields using Interfield Data", <i>SPIE</i> , <u>3050</u> :407-417, (1997)
	T*	<u>Handbook of Microlithography, Micromachining, and Microfabrication</u> , Book: Vol. 1, "Microlithography", Rai-Choudhury, P. (Ed.), SPIE Optical Engineering Press, SPIE, Bellingham, Washington, pages 417-418, (1997)
	U*	Hasan <i>et al.</i> , "Automated Electrical measurements of Registration Errors in Step-and-Repeat optical Lithography Systems", <i>IEEE Transactions on Electron Devices</i> , <u>ED27(12)</u> :2304-2312, (1980)
	V*	Kemp <i>et al.</i> , "A "golden standard" wafer design for optical stepper characterization", <i>SPIE</i> , <u>1464</u> :260-266, (1991)
	W*	KLA 5105, "Linewidth and Misregistration System", KLA 5105 Product Specifications, <i>KLA Instruments Corporation</i> , 2 pages, (1995)
	X*	KLA 5200, "Value-added Overlay Metrology for Advanced Lithography", KLA 5200 Product Specifications, <i>KLA Instruments Corporation</i> , 2 pages, (1996)
	Y*	Kodama, K. and Matsubara, E., "Measuring system XY-5i", <i>SPIE</i> , <u>2439</u> :144-155, (1995)
	Z*	Leica LMS IPRO, "Fully automated mask and wafer metrology system", <i>Leica</i> , pamphlet pages 1-5.
	AA*	Lin, B.J., "The Attenuated Phase-Shifting Mask", <i>Solid State Technology</i> , Special Series/Advanced Lithography, 35(1):43-47, (January, 1992)
	AB*	MacMillen, D. and Ryden, W.D., "Analysis of image field placement deviations of a 5X microlithographic reduction lens", <i>SPIE</i> , <u>334</u> :78-89, (1982)
	AC*	Martin <i>et al.</i> , "Measuring Fab Overlay Programs", <i>SPIE</i> , <u>3677</u> :64-71(1999)
	AD*	Mc Fadden, E.A. and Ausschnitt, C.P., "A Computer Aided Engineering Workstation For Registration Control", <i>SPIE</i> , <u>1087</u> :255-266, (1989)

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Sheet 3 of 4		FILING DATE: 12/02/2003	GROUP ART UNIT: Unknown

AE*	Mulkens <i>et al.</i> , "ArF Step And Scan Exposure System For 0.15 μ m Technology Node?", <i>SPIE</i> , <u>3679</u> :506-521, (1999)
AF*	Newnam, B.E. and Viswanathan, V.K., "Development of XUV projection lithograph at 60-80 nm", <i>SPIE</i> , <u>1671</u> :419-436, (1992)
AG*	Numerical Recipes, "The Art of Scientific Computing", Press et al. (Eds.), Cambridge University Press, New York, pages 52-64 (1990).
AH*	Pellegrini, J.C., "Comparisons of Six Different Intrafield Control Paradigms in an Advanced Mix-and-Match Environment", <i>SPIE</i> , <u>3050</u> :398-406, (1997)
AI*	Pellegrini <i>et al.</i> , "Super Sparse Overlay Sampling Plans: An Evaluation of Methods and Algorithms for Optimizing Overlay Quality Control and Metrology Tool Throughput", <i>SPIE</i> , <u>3677</u> :72-82, (1999)
AJ*	Preil, M.E. and McCormack, J.F.M., "A New Approach to Correlating Overlay and Yield", <i>SPIE</i> , <u>3677</u> :208-216, (1999)
AK*	Quaestor Q7, "Fully Automated Optical Metrology System for Advanced IC Production", Quaestor Q7 Product Specification, <i>BIO -RAD</i> , 2 pages
AL*	Raugh, M.R., "Error estimation for lattice methods of stage self-calibration", <i>SPIE</i> , <u>3050</u> :614-625, (1997)
AM*	Sullivan, N.T., "Semiconductor Pattern Overlay", <i>SPIE Critical Reviews of Optical Science and Technology</i> , <u>CR52</u> :160-188, (1994)
AN*	Takac <i>et al.</i> , "Self-calibration in two-dimensions: the experiment", <i>SPIE</i> , <u>2725</u> :130-146, (1996)
AO*	van den Brink <i>et al.</i> , "Direct-referencing automatic two-points reticle-to-wafer alignment using a projection column servo system", <i>SPIE</i> , <u>633</u> :60-71, (1986)
AP*	van den Brink <i>et al.</i> , "Matching Management Of Multiple Wafer Steppers Using A Stable Standard And A Matching Simulator", <i>SPIE</i> , <u>1087</u> :218-232, (1989)
AQ*	van den Brink <i>et al.</i> , "Matching Of Multiple Wafer Steppers For 0.35 μ m Lithography Using Advanced Optimization Schemes", <i>SPIE</i> , <u>1926</u> :188-207, (1993)
AR*	van den Brink <i>et al.</i> , "Matching Performance For Multiple Wafer Steppers Using An Advanced Metrology Procedure", <i>SPIE</i> , <u>921</u> :180-197, (1988)
AS*	van den Brink <i>et al.</i> , "New 0.54 Aperture i-Line Wafer Stepper With Field By Field Leveling Combined With Global Alignment", <i>SPIE</i> , <u>1463</u> :709-724, (1991)

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 Sheet 4 of 4		FILING DATE: 12/02/2003	GROUP ART UNIT: Unknown

	AT*	van Schoot <i>et al.</i> , "0.7 NA DUV Step & Scan System For 150nm Imaging With Improved Overlay", <i>SPIE</i> , 3679:448-463, (1999)
	AU*	Yost, A. and Wu, W., "Lens matching and distortion testing in a multi-stepper, sub-micron environment", <i>SPIE</i> , 1087:233-244, (1989)
	AV*	Zavec <i>et al.</i> , "Life Beyond Mix-and-Match: Controlling Sub-0.18 μ m Overlay Errors ", <i>Semiconductor International</i> , 23(8):205,206,208,210,212 and 214, (July, 2000)
	AW*	Zavec, T.E., "Machine Models and Registration", <i>SPIE Critical Reviews of Optical Science and Technology</i> , CR52:134-159 (1994).

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